



Water Quality Standards Human Health Criteria Technical Workgroup Meeting #6

Alaska Department of Environmental Conservation
Division of Water- Water Quality Standards
February 24, 2016



Webinar instructions:

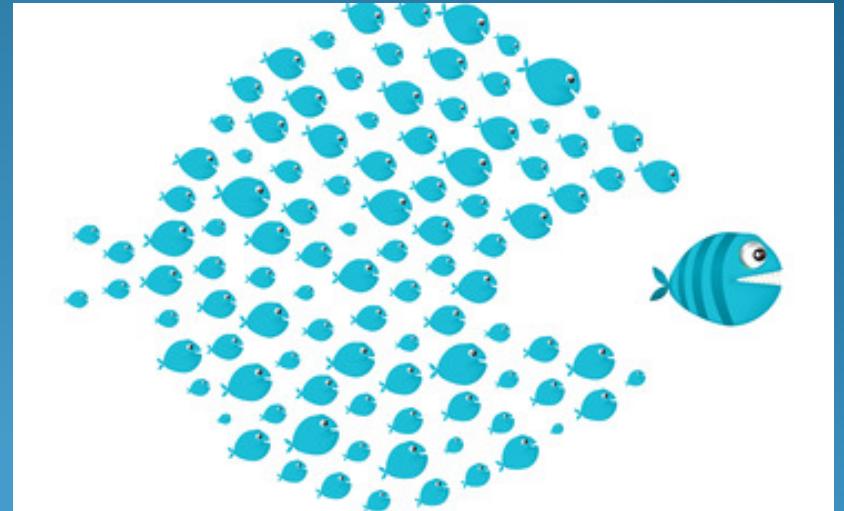
- For audio please dial: **1-800-315-6338**
- Access code: **51851**
- Note that all lines will be muted during the presentations
- Public testimony will be taken at the end of the webinar.

PLEASE BE RESPECTFUL OF ALL PARTICIPANTS



Purpose of Technical Workgroup

- Provide technical feedback on issues associated with development of human health criteria (HHC) in state water quality standards
 - **Develop a Summary Report**
- Identify key sources of information that may be applicable to the process
- Ensure a variety of stakeholder voices are heard





Questions to be considered by the Workgroup

- Issue #1: What information about fish consumption and fish consumption rates is available to inform the HHC process?
- Issue #2: What options does DEC have for developing criteria on a statewide/regional/site specific basis?
 - Issue #2a: What modeling approach(es) should DEC consider (Deterministic v. Probabilistic)?
- Issue #3: What is the appropriate level of protection for Alaska and its residents?
 - **Issue #3a: How should DEC apply bioconcentration v. bioaccumulation factors?**
 - **Issue #3b: How should DEC address concerns about its carcinogenic risk value?**



Questions to be considered by the Workgroup

- What should Alaska's FCR(s) be?
 - Issue #4a: What species should Alaska include for deriving a fish consumption rate?
 - Marine Fish (i.e., salmon?;)
 - If we include- Can we adjust FCR values based on lipid content?
 - Marine Mammals (AK would be the only state that considers this issue)
 - Issue #4b: What is the role of Relative Source Contribution (RSC) in relation to other exposure issues and what are Alaska's options?
- Issue #5: What are Alaska's options for implementing the proposed criteria?
 - Existing tools (compliance schedules) and new tools (variances, intake credits)



Outline of Today's Meeting

- Recap of Meeting 5
 - RSC concerns
- Goal of today's meeting:
 - Introduce Bioaccumulation/Bioconcentration
 - Introduce Cancer Risk Level issue
- Status of Regional Sub-group



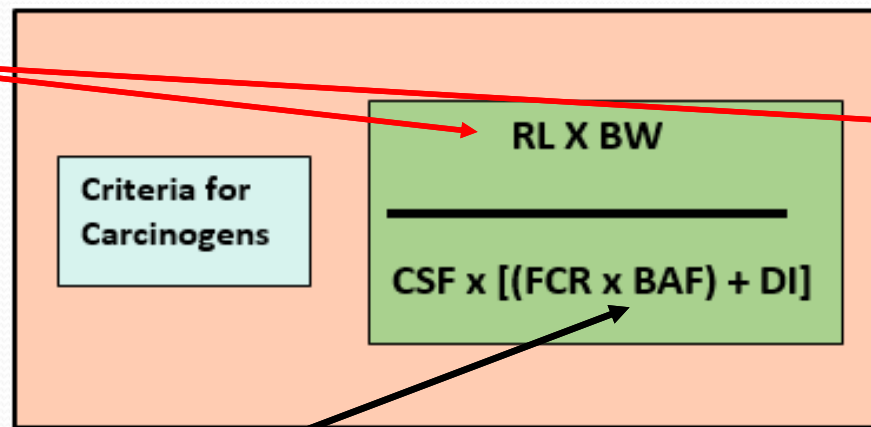
Meeting #5 Recap

- Workgroup Report to date
 - Questions/Comments
 - Additional thoughts on questions previously raised?
 - DEC plans to have a second draft available for discussion this spring
- Thoughts on RSC?

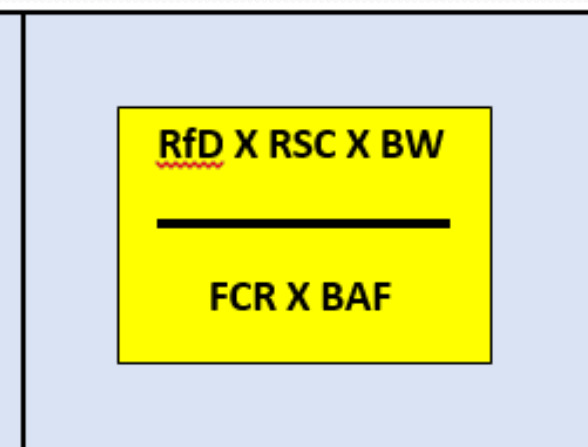
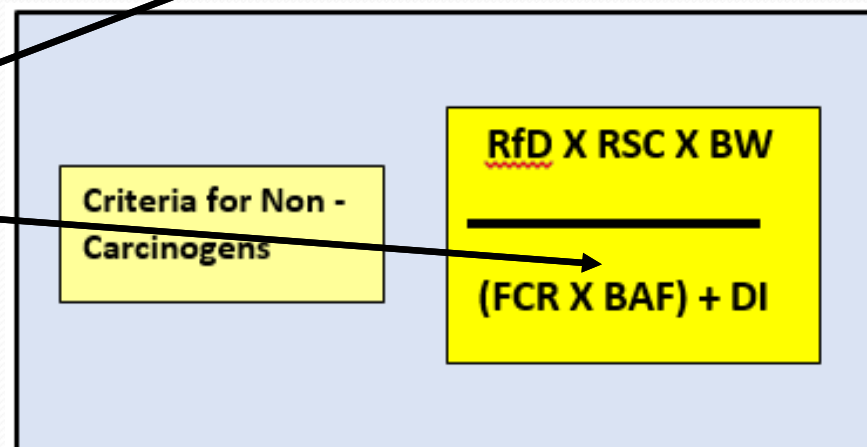
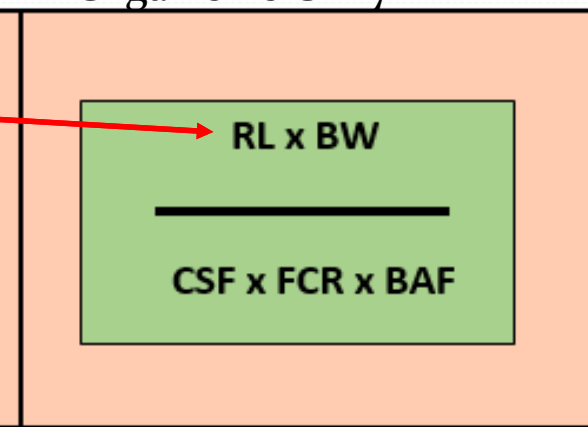
HHC Equation(s)

- **RL: Risk Level**
- **CSF: Cancer Slope Factor (IRIS)**
- **RfD: Reference Dose (mg/Kg-day) (IRIS)**
- **RSC: Relative Source Contribution**
- **BW: Body Weight**
- **FCR: Fish Consumption Rate**
- **BAF: Bioaccumulation**
- **DI: Drinking Water**

Freshwater Criteria
Consumption of Organisms **and** Water



Marine Criteria
Consumption of
Organisms **Only**





Pre-meeting Background Information

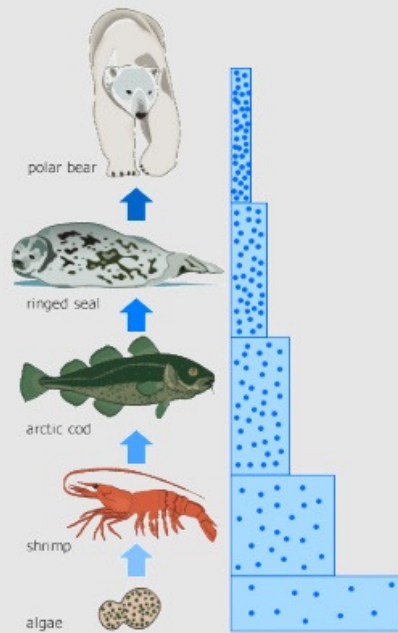
- DEC provided EPA 2015 *Development of National Bioaccumulation Factors: Supplemental Information for EPA's 2015 Human Health Criteria Update*

Bioaccumulation (BAF) v. Bioconcentration (BCF)

- BAF reflects uptake from **all** sources and pathways
 - Water, food, and sediment
 - The ratio of the chemical concentration in the organism (CB) and the water (CW), including the uptake in the diet.
 - BAF is reported as liters per kilogram of lipid in both organism and water ($BAF = t/w$)
- BCF reflects absorption of chemicals through respiratory and dermal surfaces
 - Subset of bioaccumulation
 - For fish and shellfish this is uptake through exposure to water (e.g. gills)
 - The concentration of test substance in/on the fish or specified tissues thereof divided by the concentration of the chemical in the surrounding medium at steady state.
 - Generally lab-derived or modeled values

BAF considerations

biomagnification and
bioaccumulation



- BAF = exposure to a pollutant through diet, water contact, and trophic position (where in the food chain)
- BAF can range from 1- 1000's for highly bioaccumulative compounds (e.g., PCBs)
- - Low bioaccumulation = exposure from drinking water
 - High bioaccumulation = ↑ exposure from eating fish
- For persistent or hydrophobic chemicals, the BAF can be significantly higher than BCF

EPA currently recommends adoption of a BAF based on trophic level (2-4)

HHC History

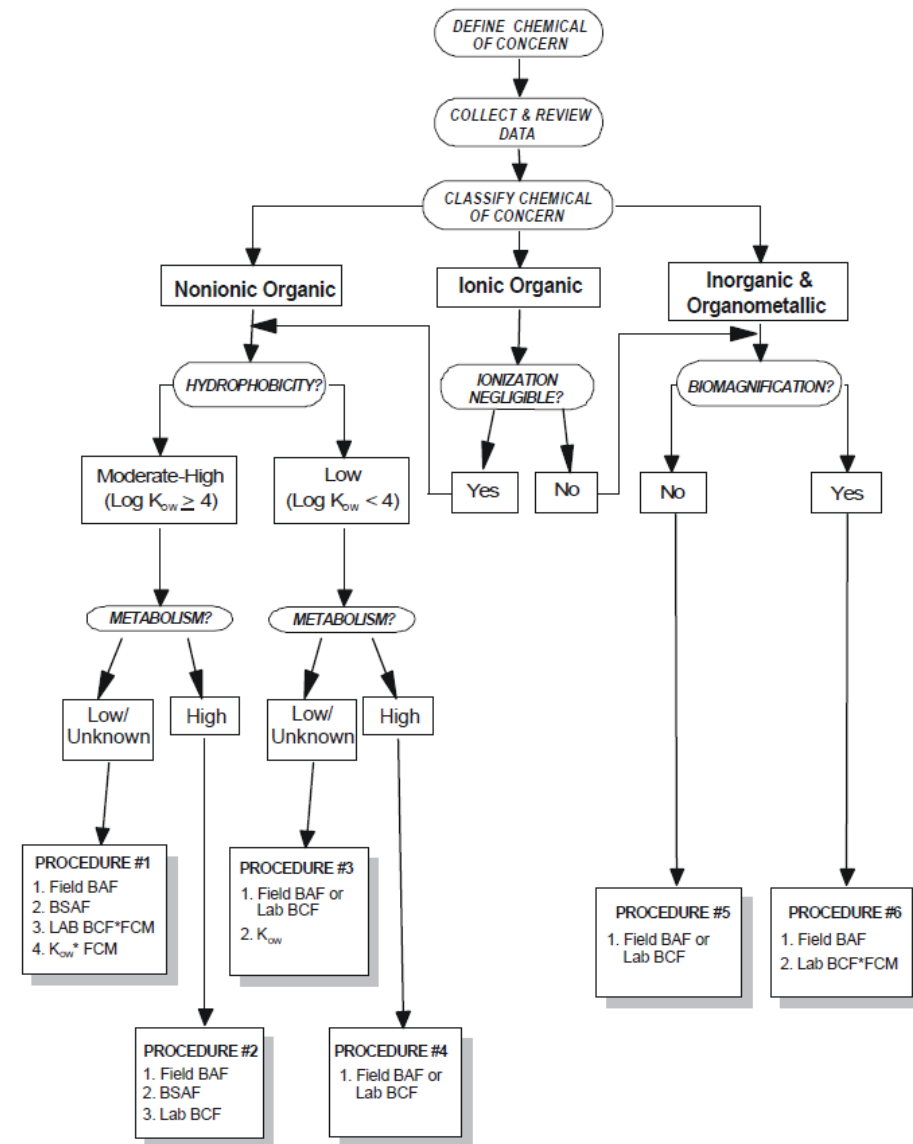
- EPA and states have previously used BCF values for HHC
 - Many of these were developed some time ago
 - BAF for a chemical may be higher or lower than national values
- 2000 Methodology recommends BAF based on locally appropriate info
 - 2009- TSD for Site-Specific Bioaccumulation Factors issued
 - \$\$\$ to develop/technically challenging
- WA Ecology notes that the WQS Handbook (2012) may inc. language that suggest only BCF should be used due to direct relationship with CWA
 - *For section 304(a) criteria development, EPA typically considers only exposures to a pollutant that occur through the ingestion of water and contaminated fish and shellfish.*
 - Sounds a bit like the RSC argument?

EPA 2015 Recommended HHC

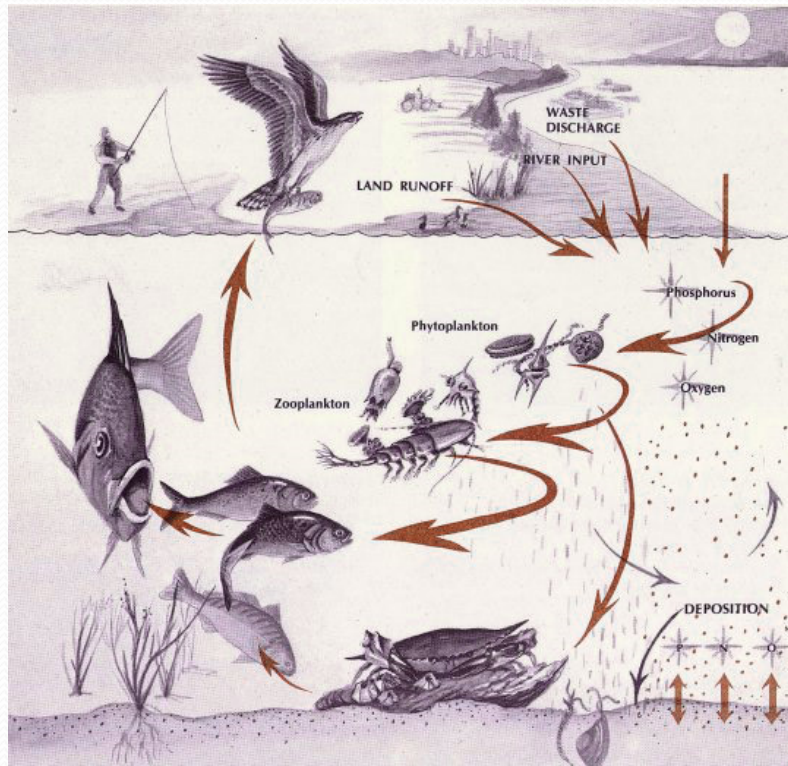
- Provided to you in advance of today's mtg
- Describe how *national* BAF values were developed for 94 updated chemicals
- Used 2000 and 2003 methodology/TSD
- Calculates Trophic Levels I-IV
 - If BAF method did not produce reliable values, BCF is reported
- May be possible to derive a TL V using the EPA 2003 TSD
 - Likely to be complicated as some marine mammals may be considered TL IV

BAF v. BCF-what should I use?

- There are various ways to calculate a BAF (Field v. lab)
- For a given chemical, there may be a better method



Once you pick a model, you need to consider Food Chain Multipliers



Improving and Protecting Alaska's Water Quality

- Need to choose one of many food chain modeling tools
- Models have different accuracy/sensitivity/uncertainty levels



Alaska...

- National dataset may not have accounted for AK
- BAF considers **both** tissue of consumed organisms and the water column.
 - Alaska has very little water column data for HHC-regulated chemicals
- Food web modeling did not account for marine mammal consumption
- While research has made recommendations on allowable g/day for some chemicals, this is not the case for all 94
- Marine mammals are not all alike- some TL4 and some potentially higher
 - That kind of dietary information may/may not be available



How have other states or tribes addressed BCF/BAF?

- **1992 NTR:** used BCF
- **Oregon:** Used BCF since Oregon-specific BAF values were not available
- **Washington:** proposed BCF in the 2016 rulemaking
- **Idaho:** Proposed EPA-2015 BAF/BCF where BAF wasn't available. Created a weighted factor based on trophic level proportions in local fish (NOTE)
- **Florida:** Used BCF in 2014 TSD but is now reviewing 2015 BAF values for application. Modified on lipid content specific to Fl. (shrimp)



Previous EPA response to Ecology on 2014 draft criteria

- *BAFs account for biomagnification in the food chain, which is an essential pathway that Ecology is missing by using BCFs.*
- *If Ecology chooses not to use the latest scientific information on bioaccumulation, the EPA strongly recommends that Ecology provide a rationale for choosing not to integrate the latest science regarding bioaccumulation into its human health criteria.*



Discussion

Sample questions:

- Are there specific concerns you have with using the EPA-2015 BAF recommendations?
- Should national BAF values be acceptable to Alaska if Alaska species or conditions are not considered?
- Since there is a degree of uncertainty in using derived BAFs, would BCFs be more scientifically acceptable?



Cancer Risk Level

- Nancy Presentation



Loose ends

- Regional Working Group
 - Consists of Marylynne, Lori, Ali, Bob, Nancy
 - Met on 2/17
 - Jim has a paper coming out in March in *Arctic* that will be helpful in our discussion



Next steps:

1. DEC needs to spend time making sure the questions are framed appropriately for the workgroup to begin drafting recommendations:
 1. Circle back to previous issues/discussions and keep writing based on your comments?
 2. Address all issues and then begin drafting recommendations & Workgroup Report?
2. HHC Workgroup Meeting #7
3. Introduce Issue #2: What options does DEC have for developing criteria on a statewide/regional/site specific basis?
4. DEC will distribute the draft notes to get your feedback
 - DEC needs feedback so we can add to the Workgroup Report

Thank you!

